IN THE CLAIMS:

Claim 1 (Canceled)

Claim 2 (Currently Amended): The laser-based measuring apparatus according to claim [[1]] 9, wherein said reflection planes comprise reflectors mounted on the object.

Claim 3 (Currently Amended): The laser-based measuring apparatus according to claim [[1]] 9, wherein said object is a cylinder having an axis of rotation orthogonal to said measuring axis, and said reflection planes are side surfaces of said cylinder opposing to each other on a diameter.

Claim 4 (Original): The laser-based measuring apparatus according to claim 3, wherein said measuring apparatus comprises a plurality of said opposing incident optical systems.

Claim 5 (Canceled)

Claim 6 (Currently Amended): The laser-based measuring method according to claim [[5]] 10, wherein said reflection planes comprise reflectors mounted on the object.

Claim 7 (Currently Amended): The laser-based measuring method according to claim [[5]] 10, wherein said object is a cylinder having an axis of rotation orthogonal to said measuring

axis, and said reflection planes are side surfaces of said cylinder opposing to each other on a diameter.

Claim 8 (Original): The laser-based measuring method according to claim 7, wherein a plurality of opposing incident optical systems are provided.

Claim 9 (New): A laser-based measuring apparatus for measuring an amount of travel of an object, comprising:

a laser light source;

a portion for generating at least two measuring light beams by dividing a light beam provided from the laser light source;

two reflection planes included in the object moving on a measuring axis, said reflection planes arranged back-to-back to each other on said measuring axis;

an opposing incident optical system for directing said two measuring light beams through separate optical paths into said two reflection planes, respectively, such that said two measuring light beams oppose to each other on said measuring axis, wherein said opposing incident optical system receives light beams reflected by said two reflection planes to recombine the reflected light beams so as to interfere with each other to generate interfered light;

a photodetector for receiving the interfered light to generate a beat signal as the difference of optical frequencies by heterodyne detection; and

a measuring circuit connected to the photodetector for calculating the amount of travel of an object which changes an optical path length of a portion of an optical path based on the beat signal.

Claim 10 (New): A laser-based measuring method for measuring an amount of travel of an object, comprising the steps of:

setting two reflection planes included in the object moving on a measuring axis, such that said two reflection planes are arranged back-to-back to each other on said measuring axis;

generating at least two measuring light beams by dividing a light beam provided from a laser light source;

directing said measuring light beams through separate optical paths into said two reflection planes, respectively, such that said measuring light beams oppose to each other on said measuring axis;

receiving light beams reflected by said two reflection planes to recombine the reflected light beams so as to interfere with each other to generate interfered light;

photo-detecting the interfered light to generate a beat signal as the difference of optical frequencies by heterodyne detection; and

calculating the amount of travel of an object which changes an optical path length of a portion of an optical path based on the beat signal.